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Another web in the wall: A new *Pikelinia* Mello-Leitão, 1946 (Araneae, Filistatidae) from Colombia, with notes on its diet and description of the female genitalia of *P. fasciata* (Banks, 1902)

Osvaldo Villarreal[1,2], Leonardo Delgado-Santa[3], Julio C. González-Gómez[4], Germán A. Rodríguez-Castro[5], Andrea C. Román[6], Esteban Agudelo[5], Luís F. García[7]

1 *Centro de Ecología, Instituto Venezolano de Investigaciones Científicas (IVIC), km 11 carretera Panamericana, Altos de Pipe, edo. Miranda 1204-A, Venezuela*

2 *Instituto y Museo del Instituto de Zoología Agrícola, Facultad de Agronomía, Universidad Central de Venezuela, Apartado 4579, Maracay 2101, Venezuela*

3 *Grupo de Investigación Ecdysis, Programa de Biología, Universidad del Quindío, Armenia, Colombia*

4 *Grupo de Investigación Biología y Ecología Animal (BEA), Centro de Investigaciones Biológica y Culturales, Corporación Huiltur, Neiva, Huila, Colombia*

5 *Grupo de Estudio en Arácnidos de la Universidad del Quindío, Armenia, Colombia*

6 *Invertebrate Collection (ICCDRS), Charles Darwin Research Station, Charles Darwin Foundation, Puerto Ayora, Galápagos, Ecuador*

7 *Polo Agroforestal, CENUR Noreste, Universidad de la República, Ciudad Rivera, Uruguay*

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Corresponding author: Leonardo Delgado-Santa (leonardodelgadosanta@gmail.com)

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Abstract

The new synanthropic crevice weaver spider species, from the family Filistatidae, *Pikelinia floydmuraria* **sp. nov.** (male and females) is described from the department of Tolima, Colombia. The female internal genitalia of *P. fasciata* from the Galapagos islands, Ecuador, is described here for the first time. Additional unidentified species of *Pikelinia* populations were recorded in the departments of Cauca, Quindío, and Risaralda. Dietary analysis of *P. floydmuraria* **sp. nov.** (Tolima) and *Pikelinia* sp. (Armenia) revealed a predominance of Hymenoptera (~35% of prey), followed by Diptera and Coleoptera. This study expands known diversity and trophic ecology of *Pikelinia* genus.

Key Words

Crevice weaver, food preferences, Galapagos Islands, Neotropic, taxonomy

Introduction

Spiders are among the most important groups of arthropod predators, playing a crucial role as regulators of insect populations, with estimates suggesting they consume up to 800 million tons of insect annually (Nyffeler and Birkhofer 2017). Their significant consumption of insects is often highlighted as beneficial in agricultural settings, where they help control a variety of pests (Michalko et al. 2019). Additionally, spiders serve as natural enemies of insects, which impact human health, particularly dipterans, which act as vectors for serious diseases (Jackson and Cross 2015). Despite their ecological importance, and significant recent advances in global study of synanthropic spiders (e.g. Wise 1995; Bertone et al. 2016; Nyffeler and Birkhofer 2017; Szinetár et al. 2020; Kempf et al. 2021; Maldonado-Carrizales et al. 2021; Cardoso et al. 2025), the biology of these spiders particularly in Colombia, has received scant attention.

The family Filistatidae is composed of 18 genera and 192 species, with only two species recorded in Colom-

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bia: the native *Pikelinia kiliani* Müller, 1987 and the introduced *Kukulcania hibernalis* (World Spider Catalog 2025). Several spiders of this family are frequently associated with urban and peridomiciliary environments, such as the southern house spider *Kukulcania hibernalis* (Hentz, 1842), the Mediterranean *Filistata insidiatrix* (Forsskål, 1775) and the Neotropical *Filistatoides insignis* (O. Pickard-Cambridge, 1896), (García-Villafuerte and Brescovit 2019; Magalhaes and Ramírez 2022; Sherwood et al. 2023). However, despite their frequent presence in human dwellings, the biology of many filistatid species, including their diet composition and potential role in controlling urban pests, remains largely unexplored.

The taxonomy of the genus *Pikelinia* Mello-Leitão, 1946 has also been the subject of recent study. Originally established by Mello-Leitão in 1946 to accommodate a single Argentine species previously described as *Filistata tambilloi* (Mello-Leitão, 1946). Since then, its species composition has been expanded through the work of Müller (1987), Ramírez and Grismado (1997), Grismado (2003), Lise et al. (2010), and Magalhaes and Ramírez (2019), now encompassing species from Argentina, Brazil, Colombia, Ecuador, and Peru. Recently, a comprehensive phylogenetic review by Magalhaes and Ramírez (2022) redefined the genus, incorporating species previously assigned to *Filistata* Latreille, 1810, *Filistatoides* F. O. Pickard-Cambridge, 1899, and proposed the genus *Missionella* Ramírez & Grismado, 1997 as a junior synonym. Currently, *Pikelinia* comprises 20 South American species, distributed from Argentina to Colombia (World Spider Catalog 2025). The genus is characterized by a modified male metatarsus II, which typically exhibits an excavation and conspicuous setae (except in two undescribed species), as well as a strong seta on the male palpal tibia and micro-teeth on the embolus opening (Magalhaes and Ramírez 2022).

Despite the taxonomic advances the ecology and biology of this group remain poorly understood. Lise et al. (2010) conducted a study that provided some preliminary insights into the ecology and phenology of a species in southern Brazil. However, much remains to be explored.

This paper makes the following three contributions to the knowledge of *Pikelinia*: (1) the description of *Pikelinia floydmuraria* sp. nov., a new synanthropic species from urban areas of department of Tolima, Colombia, representing only the second recorded species of the genus for the country; (2) the first description and illustration of the female genitalia, accompanied by a habitus photograph, of *P. fasciata* (Galapagos, Ecuador), whose spermathecae was explicitly noted as unillustrated by Ramírez and Grismado (1997); and (3) comparative dietary analyses of both the new species and an unidentified *Pikelinia* population from Armenia, Quindio.

Material and methods

The specimens studied were examined submerged in 75% ethanol using an AMScope and Leica EZ4 W stereomicroscopes. Male and female genitalia were dissected with fine forceps, and the female genitalia was cleared with lactic acid (50%) or potassium hydroxide (KOH – 10%). Photographs were made using an Olympus OM-D E-M10 Mark II camera adapted to Amscope microscope and a TrueCam camera adapted to Leica M128 stereomicroscope. Studied specimens are deposited in Colección de Insectos de la Universidad del Quindío (**CIUQ**), Museo del Instituto de Zoología Agrícola, Maracay, Venezuela (**MIZA**), and the invertebrate collection of the Charles Darwin Research Station, Galapagos, Ecuador (**ICCDRS**). All measurements are given in mm. Legs measurements are presented as such: total length (femur, patella, tibia, metatarsus, tarsus). Morphological terminology and pattern of description follows Brescovit et al. (2016a), female genital terminology follows Brescovit et al. (2016b). For the descriptions of colors, we used approximations to the centroids of the NBS/IBCC Color System (https://people.csail.mit.edu/jaffer/Color/Dictionaries#NBS). Abbreviations used: rb = receptacle base; cd = neck; r = receptacula; PME = posterior median eyes; ma = membranous area; e = embolus; rdp = retrodistal process.

Prey records

Field observations were conducted to assess the dietary composition of *Pikelinia floydmuraria* sp. nov. and *Pikelinia* sp. in urban environments. Prey remains were collected from the webs of ten adult females of each species: *P. floydmuraria* sp. nov. from Ibagué, Tolima, and *Pikelinia* sp. from Armenia, Quindío. The collected prey items were identified to the order level and quantified, to determine the dietary preferences of these species. Additionally, the relative size of spiders and their prey was measured, calculating the ratio between prey length and the spider's prosoma size. Spiders and their prey were measured using the software imageJ, and the resulting data was analyzed and plotted using the R software (R Core Team 2024).

Results

Taxonomy

Family Filistatidae Ausserer, 1867

Subfamily Prithinae Gray, 1995

Genus *Pikelinia* Mello-Leitão, 1946

***Pikelinia fasciata* (Banks, 1902)**

Filistata fasciata Banks, 1902: 55, 1924: 95.
Filistatoides fasciatus Mello-Leitão, 1946: 46; Baert 1987: 151.
Pikelinia fasciata Ramírez & Grismado, 1997: 340; Baert et al. 2023: 9.
Figs 1, 4

Type material. The original description of *Filistata fasciata* Banks, 1902 did not explicitly designate a holotype, and the current whereabouts of the type material remain uncertain. The male genitalia were first described by

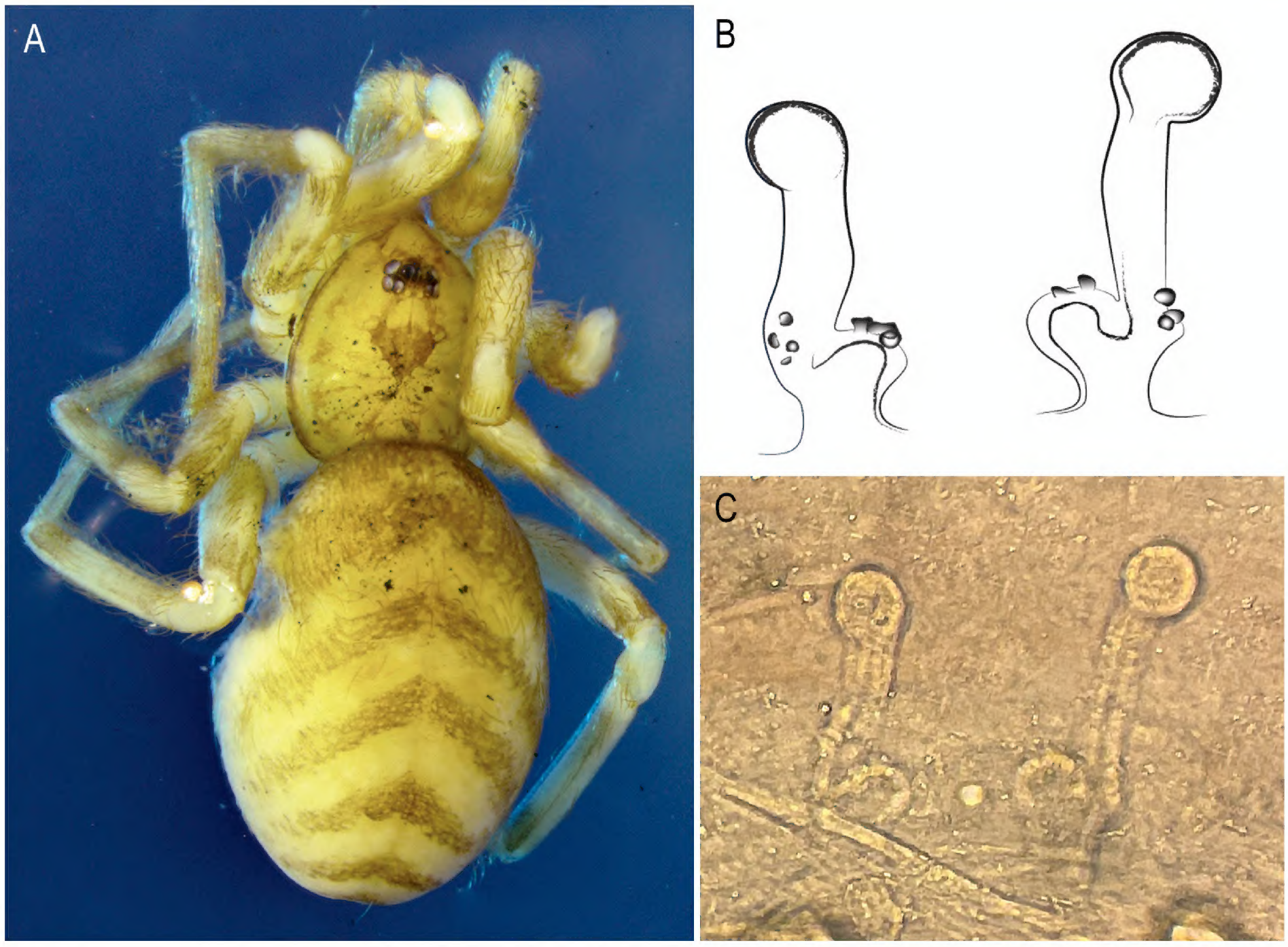

Figure 1. *Pikelinia fasciata*, female (ICCDRS 55584) from Galapagos, Isla Marchena. **A.** Habitus, dorsal view; **B, C.** Spermathecae, dorsal view. Photos: Andrea C. Román.

Baert (1987: fig. 25A–D), and then in Baert et al. (2023: figs 31–34). For the purpose of this work, the species is defined by the male morphology as redescribed by Baert et al. (2023). The designation of a neotype may be considered in future works if the original types cannot be located, to further secure nomenclatural stability.

Material examined. Ecuador • 1♀, Galapagos, Isla Marchena, Playa Negra (-0.3007°, -90.5077°), 28 Apr. 2005 (N. Chasiliquin leg.) (ICCDRS 55584). • 1♂, Galapagos, Isla Santa Cruz, Bahia Tortuga (-0.7604°, -90.332°), 07 Mar. 1995, (A. Mejia leg.) (ICCDRS 55585).

Complementary description. Spermathecae with long and straight receptacle necks, originating laterally on the outer side of the receptacle base; necks thick and robust, nearly as wide as the distal receptacles; conspicuous glandular areas present at the external base of the neck and on the anteromedial surface of the receptacle base (Fig. 1B, C).

Distribution. The species is known only from the Galapagos Archipelago in Ecuador, where it has a wide distribution within the archipelago: Champion, Daphne, Española, Floreana, Gardner near Española, Genovesa, Isabela (Alcedo Volcano, Darwin Volcano, Wolf Volcano, Ecuador Volcano), Marchena, Pinta, Pinzón, San Cristóbal, Santa Cruz, Santa Fé, Santiago, Wolf (Baert et al. 2023).

Remarks. This species shares the general spermathecal pattern with *Pikelinia floydmuraria* sp. nov.; however, the ducts are much thicker and straighter (Fig. 1B, C), rather than slender and strongly S-shaped (Fig. 3E). Additionally, the abdominal coloration pattern of females differs in *P. fasciata*, the abdomen bears thin, well-defined transverse bands forming an inverted V (Fig. 1A) and isolated from one another, whereas in *P. floydmuraria*, the bands have irregular edges, are poorly defined, and are interconnected by a medial longitudinal line (Fig. 2H).

***Pikelinia floydmuraria* sp. nov.**

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Figs 2–5

Type material. Colombia, Tolima Ibagué • ♂ ***Holotype*** (4.4397°, -75.2382°) 16 May. 2025, alt. 1,280 m; (Rodríguez-Castro, G. leg.) in the walls of a parking lot, (CIUQ-026402).

***Paratype*:** • 1♀, 1 ♂; Ibagué (4.4417°, -75.2378°), 12 jan. 2024, alt. 1,143 m (Villarreal O., García L., Santa-Delgado, L., González-Gómez, J., Nieto, M. leg.), in the wall of buildings, (CIUQ-026403). • 1♀, 1 ♂; Ibagué (4.4417°, -75.2378°), 12 jan. 2024, alt. 1,143 m (Villarreal O., García L., Santa-Delgado, L., González-Gómez, J., Nieto, M. leg.), in the wall of buildings, (MIZA 0105938).

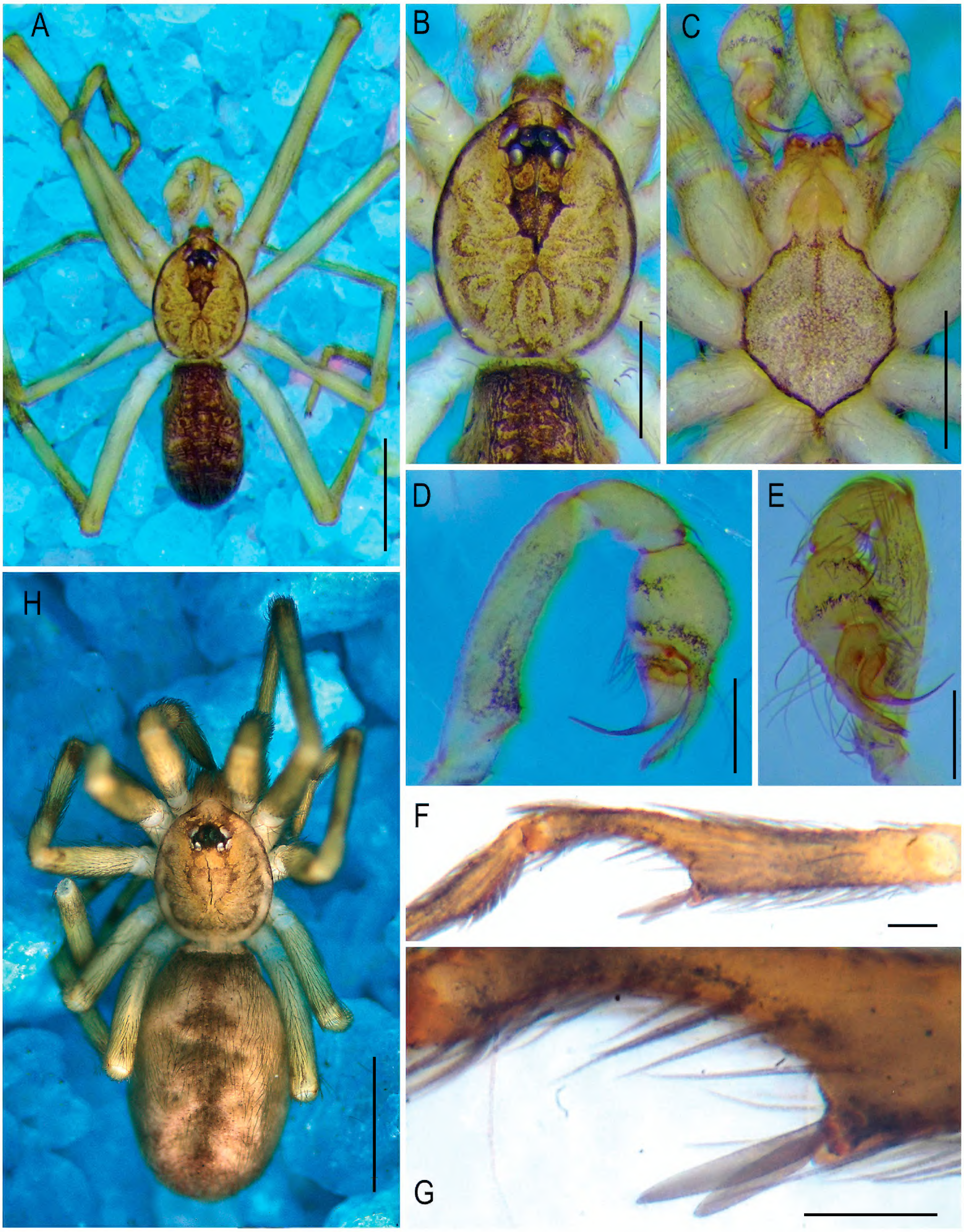

Figure 2. *Pikelinia floydmuraria* sp. nov., male paratype (MIZA-0105938). **A.** Habitus, dorsal view; **B.** Carapace, dorsal view; **C.** Sternum and coxae, ventral view; **D.** Left Pedipalp, retrolateral view; **E.** Left Pedipalp, prolateral view; **F.** Right leg II, metatarsus and tarsus, prolateral view; **G.** Right metatarsus II, detail of modified setae, prolateral view; **H.** Female paratype (CIUQ-026403) Habitus, dorsal view. Photos: Osvaldo Villarreal (**A–C; F–G**), Leonardo Delgado-Santa (**D–H**). Scale bars: 1 mm (**A, H**); 0.5 mm (**B, C**); 0.25 mm (**D, E**); 0.1 mm (**F, G**).

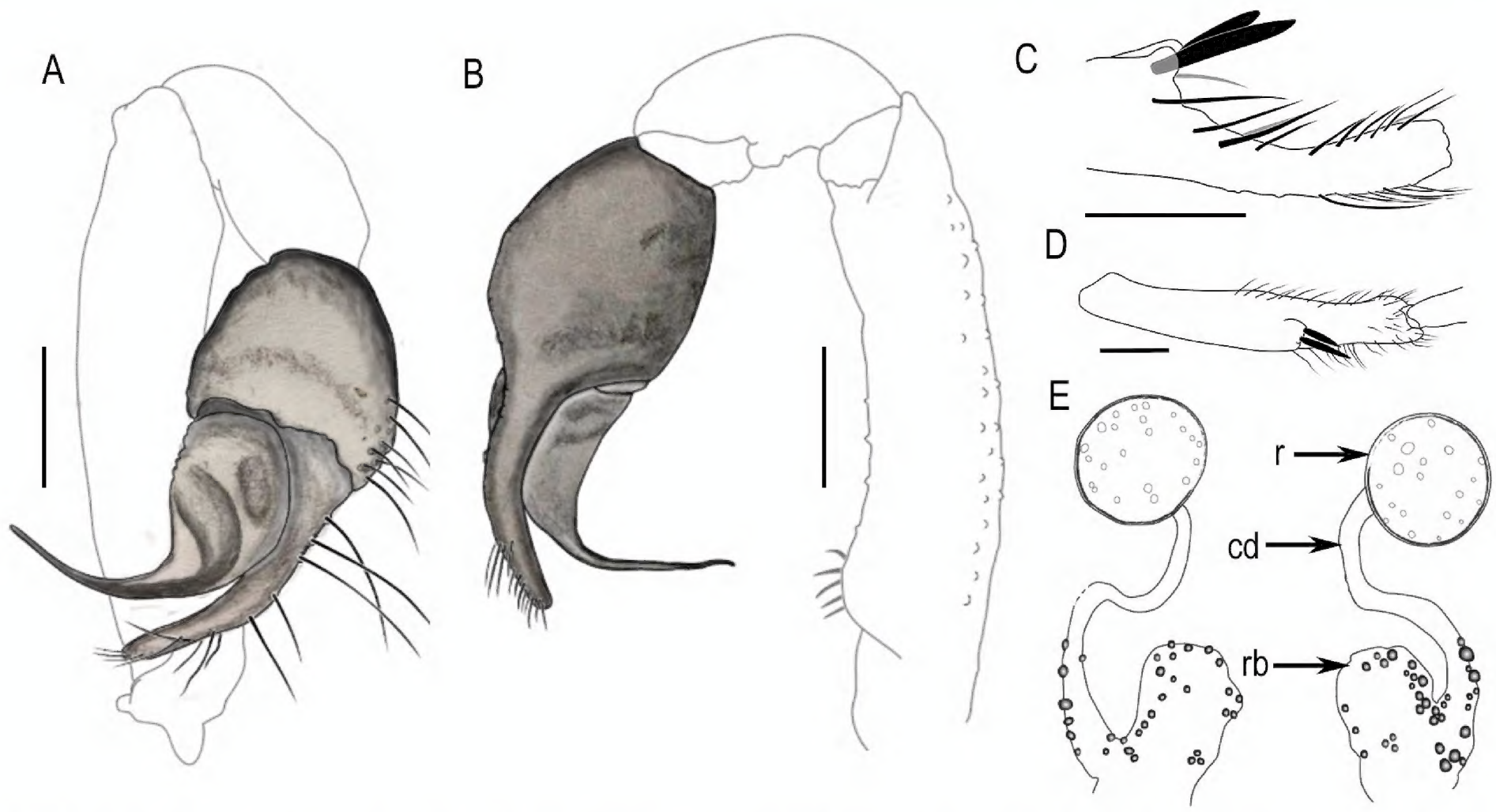

Figure 3. *Pikelinia floydmuraria* sp. nov. Male paratype (MIZA-0105938). **A.** Left pedipalp, mesal view; **B.** Same, ectal view; **C.** Left Metatarsus I, retrolateral view; **D.** Same, ventral view. Female paratype (CIUQ-026404); **E.** Spermathecae, dorsal view. Abbreviations: rb = receptacle base; cd = neck; r = receptacula. Scale bars: 0.25 mm (**A, B**); 0.1 mm (**C, D**).

***Non-type examined*:** Colombia • 3 ♀♀, Tolima, Ibagué (4.4400°, -75.2383°) 16 May. 2025 (Rodríguez-Castro, G leg), (CIUQ-026404), (CIUQ-026405), (CIUQ-026406).

Diagnosis. *Pikelinia floydmuraria* sp. nov. is the most similar and morphologically closest species to *P. fasciata*, sharing a nearly identical male palpal structure and leg II chaetotaxy. Males are distinguished from *P. fasciata* by the concolor leg pattern (vs. annulate) and the abdominal pattern of an irregular longitudinal central blotch (vs. two anterior pale spots and five transversal bands). Females are differentiated by the spermathecae with long, slender, S-shaped receptacle necks (vs. shorter, stouter, and C-shaped in *P. fasciata*).

Etymology. The specific epithet "*floydmuraria*" is a neologism derived from "Floyd" (honoring the band Pink Floyd) and "muraria" (from Latin *mūrus*, wall), alluding to both the album "The Wall" and the species' wall-dwelling habitat.

Description. Male (holotype CIUQ-026402). Carapace moderate greenish yellow with lateral borders, thoracic groove and ocular area dark olive brown (Fig. 2A, B). Sternum, light greenish yellow (Fig. 2C), chelicerae dark yellow and anterior portion of the labium dark greenish yellow (Fig. 2C). Legs moderate greenish yellow (Fig. 2A). Abdomen dark olive brown on background light olive (Fig. 2A). Total length 4.1. Carapace 1.1 long, 0.8 wide. ***Eye diameters*:** PME 0.1, separated by about 2 × diameters. Sternum, without sigillae. ***Leg measurements*:** I 6.3 (2.3, 0.4, 1.9, 0.9, 0.8), ; ***II*:** 1.6, 0.1, 1.8, –, –, –; ***III*:** 1.2, 0.3, 1.1, 1.2, 0.6, 4.4; ***IV*:** 1.5, 0.3, 1.9, 1.5, 0.7, 5.9. Metatarsus II with a pair of large macrosetae (Figs 2F, G, 3C, D) on a cuticular outgrowth. Tarsus with some proximal ventral large setae (Fig. 2F, G). Abdomen 2.2 long. ***Palp*:** 0.8, 0.4, 0.8 long, 0.3 wide; bulb 0.3 long, embolus 0.3 long. Palp: femur subcylindrical and slightly curved; tibia 2× times longer cymbium, and slightly short than femur, with membranous area in the prolateral side and with retrodistal process large and curved; cymbium short; bulb globose and short, and embolus elongated and curved (Figs 2D, E, 3A, B).

Female (paratype CIUQ-026403). Coloration as in male, except for the carapace pattern, which consists of two irregular dark lines behind the eyes, converging towards the posterior half of the carapace, and the dorsal abdominal coloration, which exhibits a pattern of an irregular longitudinal central blotch with lateral expansions (Fig. 2H). Total length 3.1. Carapace 1.1 long, 0.9 wide. Sternum as in male. ***Eye diameters*:** PME 0.07, separated by about 2× diameters. ***Pedipalp*:** length 0.6, patella 0.1, tibia 0.4, tarsus 0.3. ***Legs measurements*:** I: 1.1, 0.3, 1.1, 0.7, 0.5, 3.7; ***II*:** 1, 0.2, 0.8, 0.5, 0.3, 2.8; ***III*:** 0.6, 0.2, 0.6, 0.5, 0.3, 2.2; ***IV*:** 1.3, 0.2, 0.6, 0.8, 0.3, 3.2. Pedipalp hirsute. Abdomen 1.5. Spermathecae with long, slender, S-shaped receptacle necks, globose receptacles; necks originating laterally on the outer side of the receptacle base. Receptacle bases thumb-shaped, bearing abundant glandular pores (Fig. 3E)

Variation. Males (N=2): total length 3□4.2 (average 3.6); carapace 1.4□1.7 (average 1.6); femur I 2.8□4.5 (average 3.7). Females (N=7): total length 2.4□3.9 (average

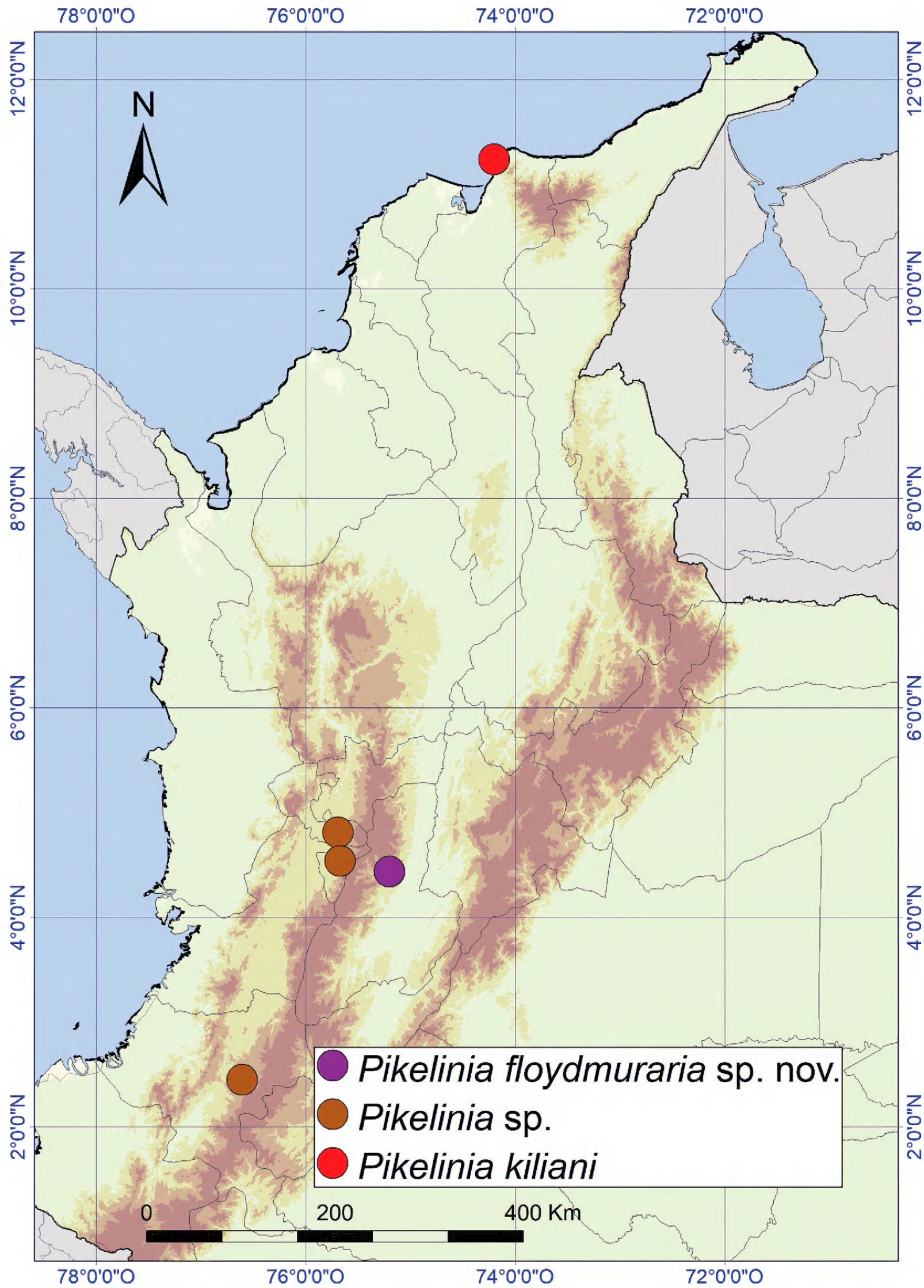

Figure 4. Map, showing the distribution of *Pikelinia* species in Colombia.

3.2); carapace 0.7□1.4 (average 1.1); femur I 0.7□1.6 (average 1.2).

Distribution. Known only from the department of Tolima (Fig. 4).

Natural history. Spiders were found associated with urban environments, particularly in walls next to streetlights (Fig. 5E, F) where observed concentrations reached 20–30 individuals/m^2 (including juveniles). No specimens were found in natural conditions (i.e. far from urban habitats). Only specimens of *Pikelinia* sp. from Popayan were found in rural areas but also associated with anthropic conditions.

Prey records. In our analysis of *Pikelinia floydmuraria* sp. nov. prey records, we identified a total of 66

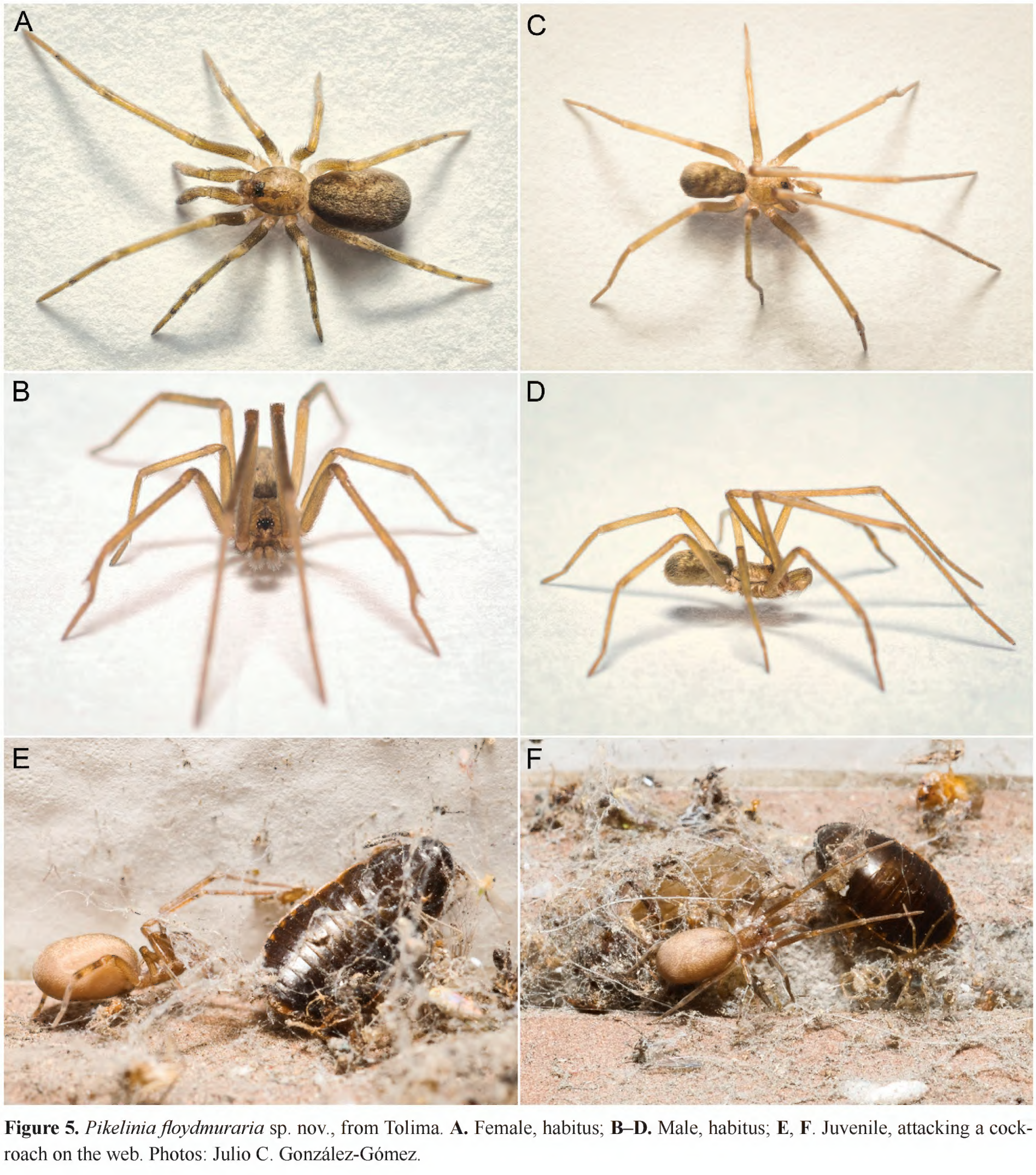

Figure 5. *Pikelinia floydmuraria* sp. nov., from Tolima. **A.** Female, habitus; **B–D.** Male, habitus; **E**, **F**. Juvenile, attacking a cockroach on the web. Photos: Julio C. González-Gómez.

prey items from five adult females in the Armenia population. In contrast, 103 prey items from 15 adult females were collected in the Ibague population. For the Armenia population, dipterans were the most abundant prey, followed by hymenopterans (mainly ants) and hemipterans. However, the Ibague population showed similar proportions of dipterans, hymenopterans (ants), and coleopterans. Other arthropods collectively constituted less than 10% of the diet in both groups (Fig. 6A). Regarding the prey size of the three most consumed orders in the Ibague population, spiders were found to prey on dipterans and coleopterans up to two times their prosoma size more frequently. For hymenopterans, spiders preyed on individuals up to six times their prosoma size, yet hymenopterans were consumed in similar proportions despite the size difference (Fig. 6B). In the Armenia population, dipterans and hymenopterans consumed in similar sizes (Fig. 6C). Notably, within dipterans, flies from the Muscidae and Culicidae families were identified but not quantified.

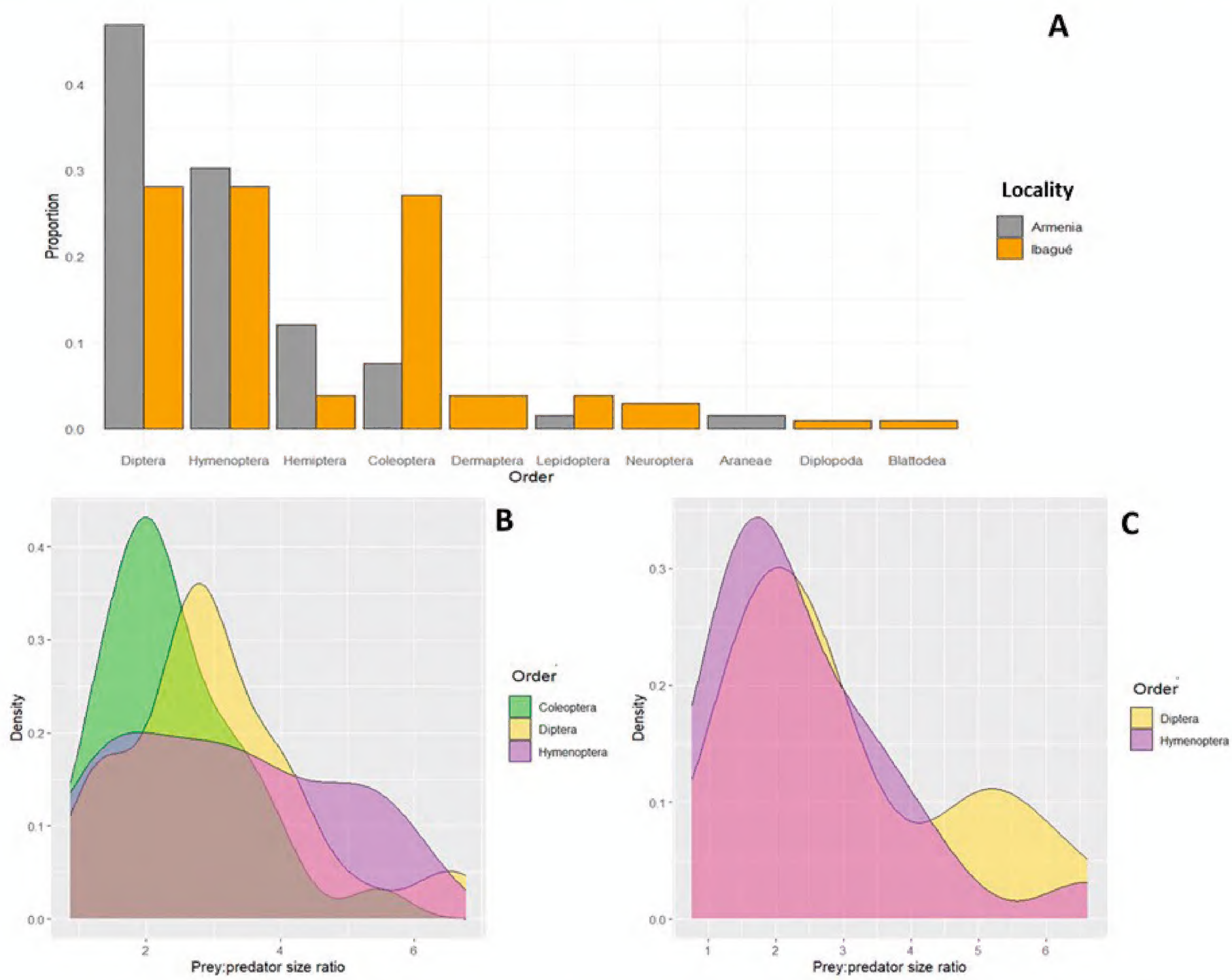

Figure 6. Dietary analysis of *Pikelinia floydmuraria* sp. nov. **A.** Bar plot showing the abundance of prey orders in the diet; **B.** Density plot depicting the size ratio between *Pikelinia floydmuraria* sp. nov. and its primary prey orders for the Ibagué population, based on 86 observations; **C.** Similar density plot for the Armenia population, based on 51 observations.

Discussion

Crevice weaver spiders, including members of *Pikelinia*, frequently occupy synanthropic and anthropized habitats (Brescovit et al. 2016a). The new species, *Pikelinia floydmuraria* sp. nov. was consistently found in such environments, where it appears abundant, suggesting a strong adaptation to human-modified ecosystems.

The genus *Pikelinia* exhibits notable interspecific variation in male pedipalpal tibia, a trait historically used for generic delimitation (Ramírez and Grismado 1997, 2008). While some species exhibit a simple tibial morphology, others, including *P. floydmuraria* sp. nov. and the Galapagos endemic *P. fasciata*, share a distinctive dorsolaterally projection, known as apical tibial apophysis. This shared morphology, coupled with similarly elongate-necked spermathecae, suggest a close phylogenetic affinity between these taxa, notwithstanding their geographic disjunction (Colombia vs. Galapagos). Although analogous duct-like spermathecal necks are present in *Antilloides* (Brescovit et al. 2016b), these likely represent convergence, given their lack of a defined receptacle base and placement in distant clades (Magalhaes and Ramírez 2022). Molecular data would clarify whether these traits reflect shared ancestry or ecological adaptation. DNA barcoding (COI) has resolved similar taxonomic challenges in spiders, enabling sex-matching and cryptic species detection (Čandek and Kuntner 2015; Blagoev et al. 2016; Valdez-Mondragón et al. 2019; Barone et al. 2024). We advocate an integrative taxonomic approach combining COI with multilocus data to: (1) test the *P. floydmuraria* sp. nov. and *P. fasciata* relationship, (2) assess undiagnosed morphological variation in Andean populations, and (3) determine if observed traits are phylogenetically constrained or ecologically driven.

The synanthropic occurrence of *Pikelinia floydmuraria* sp. nov., its morphological affinities with Galapagos congeners, and the unresolved diversity of Colombian *Pikelinia* obscure its biogeographic origin. Molecular analyses are needed to discern whether it represents: (1) a native species exploiting urban niches, or (2) a recent introduction to Colombia.

Dietary analysis revealed a predominance of hymenopterans, particularly ants – a pattern suggesting

an adaptive specialization for consuming these well-defended prey (Aceves-Aparicio et al. 2022). Remarkably, *P. floydmuraria* sp. nov. was observed preying on ants significantly larger than itself, a behavior particularly pronounced in the Ibagué population, which showed a clear preponderance of larger Hymenoptera compared to other prey orders – a pattern not observed in the Armenia population. This disparity in prey-size selection suggests intraspecific dietary plasticity, possibly reflecting local specialization as documented in other urban spiders (Líznarová et al. 2013).

The diet of *P. floydmuraria* sp. nov. consistently included dipterans known as urban pests from the Muscidae and Culicidae families (Baker et al. 2023), mirroring patterns seen in other synanthropic spiders from the same region like oecobiids (García et al. 2014). This parallel underscores a broader trend of urban-adapted spiders exploiting household arthropods. We propose that their frequent web placement near artificial lights represents a strategic adaptation to exploit phototactic prey, enhancing foraging efficiency in urban environments.

Notably, the observed differences in prey composition and size between populations highlight this species' ecological flexibility. However, challenges in preserving soft-bodied prey during collection limited accurate identification of many dietary items. To fully resolve the spider's trophic role, we recommend DNA-based dietary analysis (Pekár et al. 2017), which would clarify prey spectra across populations, validate potential local adaptations, and quantify its ecosystem service as a possible natural urban pest regulator.

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